

Africa Partnership Station: Coastal Processes

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LONG-TERM GOALS

The overreaching goal of this research is to assist with the development of research capabilities of Gulf of Guinea nations and to increase the ability of these nations to predict and mitigate coastal hazards. This is being accomplished through sponsoring and developing the coastal processes research capabilities of these nations and their university systems. This projects focuses on interactions with the research group within the Department of Oceanography and Fisheries of the University of Ghana (UG) in Accra, with a goal of not only increasing the capabilities of Ghana to monitor and manage their coast, but to develop UG as a center of research excellence for the Gulf of Guinea region.

OBJECTIVES

The objectives of these research activities are to provide guidance to the developing coastal processes research program at the Department of Oceanography and Fisheries, University of Ghana, Accra, Ghana. Development of this program is anticipated to aid maritime governance capabilities and social stability within Ghana. Over the short term, the goal is to provide technical assistance to researchers at UG to develop their capabilities to assess local coastal processes and hazards and to monitor coastal change. Development of technological capabilities (coastal processes expertise, terrestrial surveying, bathymetric surveying, wave computation, coastal change modeling, GIS skills) is intended to lead to a self-sustaining research group at the University of Ghana that can then independently pursue other research questions and seek other party funding, both locally and internationally. In 2011, the PIs continued to serve in an advisory role by providing technical assistance associated with coastal processes research conducted by the UG (PI Wiafe), with particular emphasis on shoreline change mapping, geomorphic characterization, and development of large-scale numerical models of coastal evolution. An objective for future activities is the development of independently funded international-quality collaborative research between the PIs and the coastal researchers at UG.

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APPROACH

This project consists of technical advising and the development of collaborations between the PIs and UG scientists. The primary means of interaction has been periodic interaction via email and telephone conversations, visits by UG researchers to Woods Hole, and yearly trips by the PIs to UG to engage directly with the researchers, students, and staff at UG. The initial visit, occurring in February 2009, was a week-long workshop at the University of Ghana in which included scientific presentations, field visits that included collection of preliminary topographic survey data, hands-on computer analysis exercises, and small-group discussions. A second visit by the PIs to Ghana in June of 2010 included a more intense field effort followed by detailed discussions regarding development of publications and discussing future project direction and needs. Additional interactions between UG and USGS included ongoing assessments of historical imagery and maps for coastal change analyses and a visit to WHOI by a UG faculty member during April of 2010. A workshop is scheduled at the University of Ghana November 7-11, 2011, that will include both PI's Hapke and Ashton as well as other ONR-funded PI's Tom Lippmann (University of New Hampshire) and Dano Roelvink (UNESCO-IHE).

WORK COMPLETED

Work during 2011 primarily consisted of continued technical assistance and coordination with colleagues at UG and other project collaborators, including preparation for the full group workshop in November 2011. This workshop will be the first to include all participants in the APS program, and will include summaries of research findings as well as strategic planning for future monitoring and assessments of coastal hazards along the coast. PI Hapke provided technical support and analysis of shoreline change assessments being conducted by researchers at UG. PI Ashton further analyzed first-order predictions of long-term shoreline change, with the objective of comparing those trends with measured changes as well as geologic indicators of change (some of which have been mapped using ground-penetrating radar in previous visits).

RESULTS

This fiscal year did not include a workshop or direct meetings between the PI's and UG personnel. However, the PI's continued to serve as an advisory role through email communication, particularly with Selorm Ababio, who was enrolled in a one-year coastal engineering program at the University of Southampton. The project accomplishments and goals were also presented as an invited talk in the Nearshore Processes session at the American Geophysical Union meeting in San Francisco, CA, December 2010 (Hapke et al., 2010).

IMPACT/APPLICATIONS

This project addresses the overarching goal of improving maritime security in the Gulf of Guinea, and specifically in Ghana. A short-term impact will be assessment of coastal hazards along the Ghana coast and development of a research plan to increase coastal safety through hazard identification and mitigation. The project has included sustained contact and continued development of scientific relationships between the PI's and African coastal researchers. Over the long term, the objective is to develop the independent research capabilities of the University of Ghana to improve the national capabilities in coastal hazards management and eventually maritime and fisheries management.

RELATED PROJECTS

Award Number: N00014-10-IP-20085; Preliminary Investigations of Erosional and Accretional Hotspots along the Ghanaian Coast (Alex Apostos, USGS).